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| 10/563,515 | 02/02/2006 | Toshiaki Fujii | S005-5698(PCT) | 1389 |

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| EXAMINER |
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RAMDHANIE, BOBBY

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| ART UNIT | PAPER NUMBER |
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1797

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05/11/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/563,515 | Applicant(s) FUJII, TOSHIAKI | |
| | Examiner BOBBY RAMDHANIE | Art Unit 1797 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 10 and 11 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/27/2008, 07/31/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I; claims 1-9 in the reply filed on 02/27/2009 is acknowledged.

Allowable Subject Matter

2. Claim 8 is allowed.
3. The following is a statement of reasons for the indication of allowable subject matter: Claim 8 recites a method in which among the combination of limitations includes first and second ion beams that are simultaneously used to sputter etch first and second side walls of a lamina region at the same time and under first and second conditions. The prior art of record does not suggest nor disclose these limitations.

Specification

4. The following title is suggested: Thin piece specimen method.

Claim Objections

1. Claim 9 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim can not depend on any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim 9 has not been further treated on the merits.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Iwasaki (JP04-149945).

7. Applicant's claim is toward a method.

8. Regarding Claim 1, Regarding Claim 1, Iwasaki discloses the method of making a lamina sample by A). Forming a lamina part by etching-working by scan-irradiating a focused ion beam to a sample surface, and taking out the lamina part (See Summary of Invention; Sputter etching), characterized in that, at the same time as making the lamina part by an etching working of a 1st focused ion beam or with an irradiation of the 1st focused ion beam being temporarily interrupted (See [Description of Prior Art] & [Function], [Example], & Drawing 1 Item 1); By scan-irradiating a 2nd focused ion beam from a direction parallel to a side wall of the lamina part having been made, a surface portion of the lamina is microscope-observed to thereby measure a thickness of the lamina part (See Drawing 1 Item 11 & [Example]; SEM refers to Scanning Electron Microscope & Scanning Electron Microscopy), and the etching working is finished by confirming the fact that the thickness of the lamina part has become a predetermined

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thickness (See Drawing 1 SEM functions to confirm samples at apredetermined thicknesses).

9. Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Kodama et al (JP2004-087174; An English translation of this document may be found as US7276691; rejections are referenced to the US Patent).

10. Applicant's claims are toward a method.

11. Regarding Claims 1 & 9, Kodama et al discloses the method of making a lamina sample by A). Forming a lamina part by etching-working by scan-irradiating a focused ion beam to a sample surface, and taking out the lamina part (See Figure 4, sections of Item 20 are removed), characterized in that, at the same time as making the lamina part by an etching working of a 1st focused ion beam or with an irradiation of the 1st focused ion beam being temporarily interrupted (See Column 7 line 66 to Column 20 & Figure 4 Focused liquid metal ion beam), B). By scan-irradiating a 2nd focused ion beam from a direction parallel to a side wall of the lamina part having been made, a surface portion of the lamina is microscope-observed to thereby measure a thickness of the lamina part (See Column 8 lines 21-39), and the etching working is finished by confirming the fact that the thickness of the lamina part has become a predetermined thickness (See Column 8 lines 27-43).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki in view of Barna et al (Micron, 1999).

15. Applicant's claims are toward a method.

16. Regarding Claims 2 & 5, Iwasaki discloses the method of making a lamina sample by forming a lamina part by etching-working by scan-irradiating a focused ion beam to a sample surface, and taking out the lamina part, comprising: A). A 1st process of etching-working a region, which is to be made a lamina, under a 1st focused ion beam condition by using a 1st focused ion beam, B). A 2nd process of etching-working a region, which is to be made the lamina, by using the 1st focused ion beam subsequently to the 1st process and C). A 3rd process of measuring a thickness of the region, which is to be made the lamina, by microscope-observing a surface portion of the region, which

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is to be made the lamina, by scan-irradiating a 2nd focused ion beam from a direction parallel to a side wall of the region, which is to be made the lamina, characterized in that the thickness of the region, which is to be made the lamina, is formed into a predetermined thickness while simultaneously performing or alternately repeating the 2nd process and the 3rd process (See Drawing 1 SEM functions to confirm samples at predetermined thicknesses).

17. Iwasaki does not disclose a second process of etching-working side walls of the region, which is to be made the lamina, by using the 1st focused ion beam subsequently to the 1st process is under a 2nd focused ion beam condition in which is an acceleration voltage is low and/or a beam current is low in comparison with the 1st focused ion beam condition.

18. Barna et al discloses damage occurs to the cross section during the processing of the lamina sample where the etching occurs on the side walls of the lamina sample (See Figure 6 (a-c). Barna et al also discloses that by lowering the voltage of the ion beam, the damage to the surfaces of the lamina may be reduced (See Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made modify the method of making a lamina of Iwasaki to include etching the side walls of the lamina region and to lower the acceleration voltage during the 2nd process to create a 2nd condition with the 1st focused ion beam from the 1st process to limit, reduce, and eliminate the damage caused the etching during the 1st process and therefore repeat the 2nd and 3rd processes repeatedly to form the desired structure, limit amount of remaining Ga implanted onto the side wall, and achieve an acceptable

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amount of damage remaining on the side wall of the lamina during the final milling steps.

19. Additional Disclosures Included: Claims 3 & 6: Making a lamina sample set forth in claims 2 & 5 respectively, characterized in that, after having been formed into a 1st desired thickness by applying the 2nd and 3rd processes to a 1st side wall of the region which is to be made the lamina, it is formed into the predetermined thickness by applying the 2nd and 3rd processes to a 2nd side wall of the region which is to be made the lamina (See Rejection above to Claim 2).

20. Regarding Claims 4 & 7, the combination of Iwasaki and Barna et al disclose the method of making a lamina sample set forth in claim 2 or 3 & 5 or 6, respectively, except for explicitly disclosing that, when etching-working the side wall of the region, which is to be made the lamina in the 2nd process the sample is slanted such that the 1st focused ion beam is irradiated to the side wall so as to correct its slant. Iwasaki does however disclose that the prior art uses a 5 axis stage during the etching processes (See Description of Prior Art).

21. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify changing the slant of the sample during the 2nd process in order to change where the focused ion beam may etch around the metal membrane attachment (See Iwasaki Description of Prior art).

22. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kodama et al.

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23. Applicant's claims are toward a method.

24. Regarding Claims 2 & 5, Kodama et al discloses the method of making a lamina sample by forming a lamina part by etching-working by scan-irradiating a focused ion beam to a sample surface, and taking out the lamina part, comprising: A). A 1st process of etching-working both sides of a region, which is to be made a lamina, under a 1st focused ion beam condition by using a 1st focused ion beam, B). A 2nd process of etching-working a side wall of the region, which is to be made the lamina, by using the 1st focused ion beam subsequently to the 1st process and C). A 3rd process of measuring a thickness of the region, which is to be made the lamina, by microscope-observing a surface portion of the region, Which is to be made the lamina, by scan-irradiating a 2nd focused ion beam from a direction parallel to a side wall of the region, which is to be made the lamina, characterized in that the thickness of the region, which is to be made the lamina, is formed into a predetermined thickness while simultaneously performing or alternately repeating the 2nd process and the 3rd process (See Figures 4 a-d) & See Column 8 lines 20-39).

25. Kodama et al does not disclose a second process of etching-working the side wall of the region, which is to be made the lamina, by using the 1st focused ion beam subsequently to the 1st process is under a 2nd focused ion beam condition in which is an acceleration voltage is low and/or a beam current is low in comparison with the 1st focused ion beam condition.

26. Kodama et al does however disclose damage occurs to the cross section during the processing of the lamina sample (See Column 8 lines 31-39). It would have been

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obvious to one of ordinary skill in the art at the time the invention was made to lower the acceleration voltage during the 2nd process to create a 2nd condition with the 1st focused ion beam from the 1st process to limit, reduce, and eliminate the damage caused the etching during the 1st process and therefore repeat the 2nd and 3rd processes repeatedly to form the desired structure, limit amount of remaining Ga implanted onto the side wall, and achieve an acceptable amount of damage remaining on the side wall of the lamina during the final milling steps.

27. Additional Disclosures Included: Claims 3 & 6: Making a lamina sample set forth in claims 2 & 5 respectively, characterized in that, after having been formed into a 1st desired thickness by applying the 2nd and 3rd processes to a 1st side wall of the region which is to be made the lamina, it is formed into the predetermined thickness by applying the 2nd and 3rd processes to a 2nd side wall of the region which is to be made the lamina (See Rejection above to Claim 2 in view of Column 8 lines 20-39 which indicates the processed is performed on a first side wall and then a second side wall); and Claims 4 & 7: A method of making a lamina sample set forth in claim 2 or 3 & 5 or 6, respectively, characterized in that, when etching-working the side wall of the region, which is to be made the lamina, in the 2nd process, the sample is slanted such that the 1st focused ion beam is irradiated to the side wall so as to correct its slant (See Column 8 lines 31-35; the sample stage is moved into a tilt angle with respect to the focused gaseous ion beam device)

Telephonic Inquiries

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BOBBY RAMDHANIE whose telephone number is (571)270-3240. The examiner can normally be reached on Mon-Fri 8-5 (Alt Fri off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. R./

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797